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A Case of Elephantiasis of the Scrotum.

With Remarks on its Operative Treatment.

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A CASE OF ELEPHANTIASIS OF THE SCROTUM.

WITH REMARKS ON ITS OPERATIVE TREATMENT.

BY CHRISTIAN FENGER, M.D.,
OF CHICAGO.

ELEPHANTIASIS of the scrotum is so rarely met with outside of the tropics that to us it has little more than a theoretical interest. At the same time our relations with the surrounding tropical countries where the disease is endemic are sufficiently intimate now, and are increasing to such an extent that it is very possible that cases of this disease may be met with here among immigrants from these countries, as, for instance, Barbadoes, Samoa, and China.

J. E., twenty-three years of age, German, was admitted to the German Hospital, Chicago, in January, 1891. He was born in Strasburg, of German parents, both of whom are in good health. He has three brothers and four sisters, all in good health. When he was six years old he came with his parents to Chicago, and a few years later moved to a farm at Rose Hill, one of the suburbs of that city. With the exception of the usual diseases of childhood, and a rather severe attack of typhoid fever three years ago, from which he recovered perfectly, he has always been healthy.

His present ailment, the elephantiasis, commenced eight years ago without any apparent cause, as a slight enlargement of the scrotum, followed later on by thickening of the prepuce. The enlargement increased gradually and uniformly, with no intermission. There was never any pain nor symptoms of inflammation—that is, erysipelatoid attacks in the enlarged scrotum—according to his statement. About four years ago he suffered for some time from frequent micturition and urinary tenesmus, which, after a while, subsided. Two years ago, without any cause so far as he knew, he had swelling and pain in the inguinal glands on both sides above and below Poupart's ligament, accompanied by pain, and followed in a short time by suppuration. This terminated in two or three abscesses on each side, which were permitted to open spontaneously, and after discharging for some time the opening definitely closed.

Several years ago he was obliged to have trousers especially made on account of the scrotal tumor. In spite of the size and weight of the tumor, however, he has been able to work as driver of a wagon for a railroad company with satisfaction up to this time.

On examination he was found to be robust, well nourished, of healthy appearance and color. Thoracic and abdominal organs normal. Mus-



cular strength and development normal (Fig. 1). The scrotum was enlarged and formed a tumor weighing twenty-two pounds, extending down an inch below the knees. The skin was nodular, here and there covered with scales and crusts of dried epithelium. The nodular prominences were somewhat harder than the remainder of the skin. The tumor was of a uniform firm, leathery consistence. Pressure with the fingers did not leave any indentation as in oedema. The skin was thickened so that it could not be lifted up in a fold. On the anterior upper surface of the tumor was seen a second round tumor, about the size of a fist, on the right side of which was a vertical

FIG. 1.

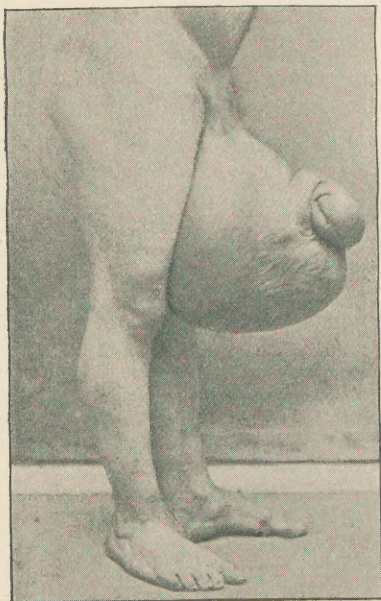
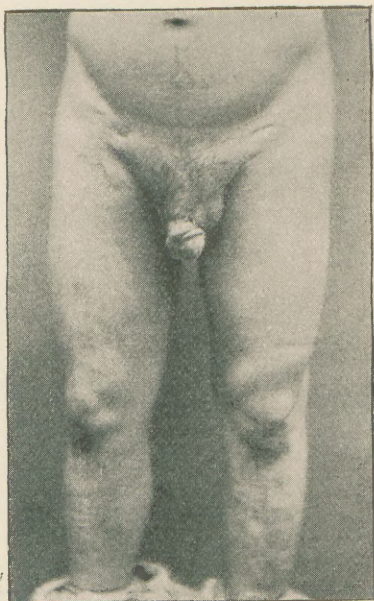


FIG. 2.



furrow two inches long, through which a probe could be passed upward into the tumor a distance of four inches. This was the opening of the prepuce, through which the patient urinated, the urine dribbling down over the large tumor. The skin over this enlarged prepuce was hard and nodulated, as was the skin of the scrotum. There were no hairs on the scrotum. The pubic hair was sparsely developed. At the junction of the scrotum with the pubic region the skin was softer and not nodulated, but still somewhat thickened and immovable, as if oedematous.

This part of the tumor formed a sort of pedicle six inches wide and three or four inches thick. Neither the testicles nor the penis could be made out.

The inguinal glands on both sides were enlarged to the size of a small walnut, as were also the glands in Scarpa's triangle. On the right side three cicatricial depressions—scars after the old abscesses—could be seen, one below and two above Poupart's ligament; and on the left side two similar scars. There was no enlargement of the deeper glands along the external iliac vessels.

The skin at the upper part of the inside of the thigh and the corresponding skin of the outer part of the tumor was the seat of intertrigo, the surface denuded, red and moist, partially covered with a whitish, fetid smegma. This surface inflammation caused the patient no pain, itching, or other inconvenience. There were no enlarged lymph-glands in any other part of the body, and no cedema of the lower limbs, on which, as well as elsewhere on the body, the skin was perfectly normal.

Urine normal. Repeated examinations of the blood at different times of the day and night showed no filaria and nothing abnormal. Appetite good; bowels regular. His mental condition was somewhat abnormal; he was melancholy and morose, did not want to talk with anyone, was not very willing to answer questions, but otherwise appeared to be sufficiently intelligent.

For two weeks previous to the operation antiseptic dressings were applied and local treatment directed to the excoriated surface between the thigh and scrotum, so as to heal the superficial inflammation of the skin at this point and as a further preparation for the operation.

On the day previous to the operation the patient was given a sublimate bath, and on the morning of the operation the tumor was held up in an elevated position for an hour in order to deplete the vessels of blood.

The patient was anesthetized and the tumor held up by two assistants, and a Turner's clamp, which I had had made to secure bloodless operating, applied over the uppermost part of the pedicle, a careful examination having first been made for inguinal hernia, which showed that no such complication existed.

A grooved director was now introduced into the sinus of the prepuce leading to the glans penis, and the overlying wall of skin divided upon it until the glans penis was exposed about three inches above the peripheral opening.

Flaps of skin were now cut as follows: The anterior surface was divided into three equal parts and three semilunar flaps cut, the median being a little larger than the two lateral flaps—each lateral flap being about two inches long and two inches broad, the median flap of the same breadth but two and one-half inches long. The two lateral flaps were intended to cover the testicles, the median flap to cover the penis. A single posterior flap was then cut through the skin, about two inches long and six inches broad; that is, the whole width of the posterior surface of the neck of the tumor. The cutaneous flaps were then dissected up to the clamp. The penis was next dissected out of the tumor, leaving about one inch of preputial mucous membrane all around the glans. The skin in this region was somewhat thickened and cedematous, but reasonably movable and pliable. The left testicle was now sought for and found without much difficulty, the tunica vaginalis communis being surrounded by a looser layer of somewhat cedematous tissue, which permitted the isolation of the testicle covered with the tunica vaginalis communis, and the spermatic cord, which was then dissected up to the clamp. The right testicle was now isolated in the same way.

Both testicles and the penis, together with the three anterior flaps, were held up toward the abdomen over the upper arm of the clamp, covered with carbolized gauze, and the neck of the tumor was ablated by a series of cuts. After dividing each portion, all visible vessels were ligated, including a number of veins two to three lines in diameter.

When the ablation of the tumor had been finally completed and all visible vessels ligated, the clamp was loosened a little at one end, whereupon a number of bleeding vessels appeared, which were taken up and ligated one by one. In all, more than sixty ligatures to large and small vessels were applied. All bleeding-points in each portion cut were ligated before the next portion was divided.

The clamp was then removed, and the hemorrhage having entirely ceased, the wound was irrigated with two and a half per cent. solution of carbolic acid and the flaps united in the following way :

The two lateral flaps were united to the lateral portion of the posterior flap over each of the testicles, and the median anterior flap and the middle portion of the posterior flap made to cover the penis by stitching the lower end to the prepuce above the glans penis. The glans penis was uncovered, and although there was no tension in the covering of the body of the penis when not in a state of erection, I should in a future case like to make the median anterior flap and the middle portion of the posterior flap about an inch longer, because the skin and the prepuce were here somewhat thickened and stiff, and thus not as mobile and flexible as in the normal condition.

Three short drainage-tubes, one for the penis and one for each testicle, were inserted and stitched to the border of the wound, and a dry iodo-form dressing applied.

The wounds healed without suppuration, pain, or rise in temperature. After a week the drainage-tubes were removed, and in four weeks the granulating surfaces at the point of insertion of the drainage-tube and at one side of the penis, where the union between the skin and prepuce had reopened a little, were entirely healed over. As will be seen from a photograph taken six weeks after the operation (see Fig. 2), the shape of the external genitals is comparatively normal, and the following condition is now present :

The glans penis is plainly visible, protruding below the scrotum. On the left side the skin of the penis is normal ; on the right, above the glans penis, there is an œdematous fold which is rapidly decreasing in size and becoming softer. The left half of the scrotum is of almost natural shape and size ; the right half not so much so, but both testicles can easily be palpated in the normal position, behind the penis. The skin at the root of the penis in the pubic region is a little thicker than normal, and is still a little more voluminous than normal, but nearly approximates the natural shape. Both inguinal regions are somewhat enlarged on account of the swelling of the subjacent lymph-glands, as will be seen in Fig. 2, where the depressions due to the somewhat retracted scars over the openings from the glandular abscesses of two years ago are plainly visible.

Urination normal. As to the sexual function, I know nothing at present. His mental condition is widely different as compared with his condition prior to the operation. Instead of his former morose and non-communicative behavior, he shows now a bright and smiling countenance, and, without being invited to do so, states that his present condition is one of great happiness as compared with the period before the operation.

Microscopical examination of the structure of the tumor from the skin downward shows thickening of the epidermis and papillary layer, but the epithelial cells are of normal shape and size. There is no line

of demarcation between the cutis and the subcutaneous tissue, the entire tumor consisting of a wide, semi-solid, elastic mass of tissue, which shows under the microscope the following characteristics:

Large areas of thick bundles of non-fibrillar connective tissue: the bundles in some locations running parallel to each other, and in other places interwoven and cut obliquely, or transversely. Between the bundles may be seen occasional and rare connective-tissue corpuscles of normal size and shape. The vessels, arteries as well as veins, but especially veins, show an enormous thickening of the walls, the smaller veins having walls five to ten times the normal thickness. This thickening is mainly an enlargement of the external coat, the endothelium not participating at all in the thickening of the wall. In the perivascular spaces are seen here and there conglomerations of leucocytes; in other places no young cells are to be seen at all. Islands of young granulation tissue, consisting of embryonal cells densely packed together and having the same appearance as the cells in ordinary young granulation tissue, are spread all over the connective tissue. These islands differ greatly in size. I was unable to find anywhere enlarged lymph-spaces or lymphatics, but am inclined to believe that some of the islands occupied by embryonal cells, in which no bloodvessels could be seen, are lymph-vessels or lymph-spaces in a state of plastic inflammation.

Elephantiasis of the scrotum (*elephantiasis Arabum*) is anatomically identical with elephantiasis of other parts of the body, whether affecting the scrotum, prepuce, labia majora or the lower extremities. We find in all cases, irrespective of the etiology, an increase in all the constituent elements of the skin and subcutaneous tissue, with the exception of the hair and the glands. Thus we find thickened epidermis and inter-papillary spaces of the epithelium, enlarged papillæ and connective tissue of the cutis. The enlargement here and in the subcutaneous tissue is due to a universal formation of new connective tissue. This new formation of connective tissue in the vessel wall, chiefly in the external coat, produces the characteristic thickening of the vessels to five or ten times their normal size. It also produces a thickening of the nerves by a similar increase of interstitial tissue between the nerve bundles.

We find in the lymphatics in the later stages of elephantiasis, as in the case reported, no very characteristic dilatation. It is different in the earlier stage of elephantiasis of the scrotum, the so-called "lymph scrotum," where the tissue is still soft and œdematous. Here we find lymph-vessels and lymph-spaces dilated, sometimes to such an extent that when situated at the surface of the skin they may form thin-walled, transparent bullæ on the surface of the tumor, which may burst and empty a clear or milky lymphatic fluid, which sometimes escapes in great quantity and may cause a temporary decrease in the size of the tumor.

The condition of the lymph-glands is important. It is common to

find, as in the above case, a considerable enlargement of the glands, an inflammatory enlargement, which, when due to invasion of pus microbes from an abraded surface on the scrotal tumor, may terminate in supuration.

The etiology of elephantiasis is still shrouded in mystery; this is especially true in the non-parasitic forms of the disease. Etiologically there is a great difference between the elephantiasis found in tropical countries and the variety of the disease seen in temperate and cold regions. In tropical countries the disease is uniformly ascribed to a parasite belonging to the class of nematodes, namely, the *Filaria Bancrofti*.¹ This filaria, a thin, white worm, three to four inches in length, and as thick as a human hair, is found in the lymph-vessels of the area of the elephantiasis. Here it deposits its thousands of eggs, out of each of which is developed an embryonal worm small enough to pass through the capillaries. This worm is periodically found in the blood of patients suffering from this disease, and is the so-called *Filaria sanguinis hominis*. It is supposed that the mature animal, as well as the ova and embryos, may cause on the one hand, by accumulation in the lymph-vessels and glands, stoppage of the lymph-current and consequent œdema in the corresponding distal territory; and on the other hand, by chemical products of their excretions, they may cause inflammation of the lymph-vessels, a plastic lymphangitis, which naturally would tend to further obstruct the lymph circulation. This may, perhaps, account for the repeated attacks of erysipelatoid inflammation in the territory of the elephantiasis.

This parasite, also, whose life history and relation to elephantiasis have been studied so carefully by Wucherer in Brazil, Lewis in Calcutta, and especially by Manson, father and son, and Myers in Amoy, and whose method of entering the human body has been studied by the last-named authors and by my friend of former years, Prospero Sonsino, of Egypt, is commonly found in our Gulf States, as has been shown in an excellent paper by Mastin, of Mobile, and confirmed by Matas, of New Orleans, and others.

It is natural, then, to find elephantiasis a common, and in some places an endemic, disease in tropical countries, to which the filaria of Bancroft is geographically limited. In some localities, as for instance Samoa, the disease is so common that, according to Turner, 50 per cent. of the adult population will, sooner or later in life, have the disease. The filaria and elephantiasis have probably been imported into islands comparatively near our coast by coolies from China, as, for instance, Barbadoes, where the disease has become endemic.

¹ B. Scheube: "Die Filaria-krankheit." Volkmann's Sammlung klin. Vorträge, 1883, No. 232.

But the filaria Bancrofti is not the only cause of elephantiasis, for sporadic cases of this disease in the scrotum, as well as in the lower extremities, are found in temperate and cold countries where the filaria does not exist, and are found in patients, as in the case here reported, who have never been in places where they could have been exposed to the invasion of the parasite. As would naturally be expected, the parasite is never found in these patients. Cases of this kind have been reported in England by Fergusson, in France by Velpeau, in Germany by Graefe, in Switzerland by Bircher, and also by other observers.

Clinically and anatomically there seems to be no difference between the elephantiasis of the tropics due to the filaria, and the elephantiasis in the temperate zone where no filaria is found. The changes in the lymphatic system, erysipelatoid inflammations in the lymph-spaces of the skin, and swelling of the lymph-glands, are characteristic of both classes of the disease. This swelling of the lymph-glands does not necessarily mean obliteration of the lymph-current, as stated by Kocher in his excellent monograph on diseases of the male genital organs,¹ for in a case of elephantiasis published by Bryk, the enlarged lymph-glands were permeable and the lymph-vessels dilated, even as far as the thoracic duct. Swelling of the lymph-glands, according to Kocher, often precedes the development of elephantiasis, and is supposed to play an important part in the etiology of the disease, both within and outside of the tropics. But it is entirely unknown why so common an affection as enlargement of the lymph-glands should result in elephantiasis in such exceedingly exceptional instances as we find to be the case.

Symptoms.—Elephantiasis of the scrotum is usually of a softer consistence than when the disease exists in the legs, but the swelling increases more rapidly. Soft and oedematous at first, the so-called lymph-scrotum, it gradually becomes harder. The unequal thickening of the epidermis causes the surface, which was originally smooth, to become nodular and irregularly corrugated. The increase is not uniform, but intermittent, following the repeated inflammatory attacks. These attacks are characterized by redness and swelling, but are attended by very little pain, the skin over the tumor being to a greater or less extent anæsthetic. Atrophy of the sebaceous glands and hair-bulbs is followed by falling out of the hair. Here and there scales of thickened epidermis and crusts of dried secretion from abraded surfaces or from ruptured dilated lymph-vessels cover smaller or larger areas over the tumor.

By the increase in the size of the tumor the testicles are buried, so that after a while their location cannot be detected except when hydrocele coexists. The increase in size of the prepuce, together with the

¹ Theodor Kocher; "Die Krankheiten der männlichen Geschlechtsorgane." Deutsche Chirurgie, von Billroth und Luecke, 1887.

increase in the skin of the scrotum, makes the penis disappear, the skin being drawn downward and forward in front of the glans, forming a sinus sometimes several inches long leading up to the urethra, surrounded by a separate tumor like a smaller appendix on the anterior surface of the large tumor. A deep furrow is usually seen on the end or on one of the sides of the transformed prepuce, which forms the entrance to the urinary sinus through which the urine dribbles down during micturition over the tumor, which probably helps in the causation of the maceration of the epidermis and the surface inflammation.

As the elephantiasis is on the whole painless, the chief inconvenience to the patient is caused by its weight. Tumors of thirty to fifty pounds in weight are commonly seen, and a tumor weighing one hundred pounds has exceptionally been observed. This, however, does not influence the general health of the patient, who is, as a rule, as in the case cited above, able to do manual labor, notwithstanding the presence of the large tumor.

The *prognosis* is good, and it is only in exceptional cases that danger arises from septic inflammation on the surface of the tumor, with gangrenous destruction of a portion of the inflamed area and resultant general sepsis.

Treatment.—Elevation of the tumor, compression, warm, moist applications, local mercurial inunctions, in connection with the internal use of the iodides, iron, chlorate of potassium, and bichloride of mercury, have proved successful in exceptional cases only, and then in the earlier stages alone.

Non-radical treatment is, of course, of far more importance in elephantiasis of the lower extremities, where amputation should be deferred as long as possible, than in elephantiasis of the scrotum, where early operation is so much the more admissible, as no mutilation of the genital organs is caused by it.

The dangers of the operation in elephantiasis of the scrotum are hemorrhage and sepsis. For this reason, in former times, partial excisions and operations with the *écraseur* or galvano-cautery were resorted to, but these procedures have now become entirely obsolete.

The prognosis of the operation, which in pre-antiseptic times was comparatively grave, has gradually lost its dangers. Thus we see, from Kocher's statistics, an early mortality of twenty-seven per cent. in sixty-one cases reported by Fayrer; of nine and one-half per cent. in twenty-one cases reported by Ballingall; of five per cent. in one hundred and sixty-one cases reported by Esdaile; of three and three-tenths per cent. in sixty-one cases reported by Manson; and more recently one and one-half per cent. in one hundred and thirty-eight cases reported by Turner. The better prognosis of the operation in Turner's cases is due to asepsis as well as to the great improvement in the technique of the operation.

Therefore, in the case above reported I adhered strictly to the method of operating as laid down by Turner. Hæmostasis is made absolute by the use of Turner's clamp, which has been already mentioned.

Perfect covering of the penis and testicles is secured by the flaps as devised by Turner and described in my operation, thereby avoiding sepsis from non-union of a large wound surface, as in the older operations, in which for fear of hemorrhage the tumor was cut off transversely, or in which sometimes the penis and testicles were removed with the tumor and the large wound surface left to heal by granulation.

The bloodless operation, by means of the clamp or elastic constriction, gives the operator time to carefully dissect out the penis, testicles, and spermatic cord, and to open and radically operate upon hydrocele, if present. The clamp is preferable to an elastic constrictor, because the latter is, as stated by Kocher, very liable to slip off during the separation of the tumor, while the clamp can be gradually loosened one end at a time, admitting ligation of the smaller vessels step by step. This makes the operation with the clamp, notwithstanding the numerous and very large vessels, almost entirely bloodless.

The removal of the penis and testicles can in all probability be always avoided by Turner's operation, and should at least be always attempted, although Esdaile regards it as dangerous not to remove these organs in tumors which weigh more than fifty pounds. In two cases reported by Lloyd, tumors of sixty-five and sixty-one pounds in weight, respectively, were successfully removed with preservation of the penis and testicles. In these operations soft twisted ropes were used as constrictors and the flaps made according to the method of Turner.

The preservation of the penis and testicles is the more important because the genital functions remain undisturbed in the case of patients suffering from elephantiasis.

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